## REMARKS/ARGUMENTS

### I. General Remarks and Disposition of the Claims

Please consider the application in view of the following remarks. Applicants thank the Examiner for her careful consideration of this application.

At the time of the Office Action, claims 18-32 and 35-77 were pending in this application. Claims 20-24, 27, 30, 37-41, 44, 47, 50-64, and 67 are withdrawn from consideration. Claims 18, 19, 25, 26, 28, 29, 31, 32, 35, 36, 42, 43, 45, 46, 48, 49, 65, 66, and 68-77 were rejected in the Office Action. Claims 25 and 42 are objected to. By this paper, claims 18, 25, 35, 42, 50, 57, 68, and 73 have been amended. These amendments are supported by the specification as filed. All the amendments are made in a good faith effort to advance the prosecution on the merits of this case. It should not be assumed that the amendments made herein were made for reasons related to patentability. Applicants respectfully request that the above amendments be entered and further request reconsideration in light of the amendments and remarks contained herein.

### II. Remarks Regarding Objections to the Claims

Claims 25 and 42 stand objected to. With respect to this objection, the Office Action states:

> Claims 25 and 42 are objected to because of the following informalities: "HT epoxy-based resin" should be changed to "high-temperature epoxy-based resin". Appropriate correction is required.

(Office Action at 2.) Although Applicants do not necessarily agree, Applicants have amended claims 25 and 42, as well as claims 57 and 73, as suggested by the Examiner. Therefore, Applicants respectfully request the withdrawal of this objection.

### III. Remarks Regarding Rejections Under 35 U.S.C. § 103(a)

#### A. Claims 35, 36, 42, 45, 48, 49, 65, 66, 68-70, and 72-75

Claims 35, 36, 42, 45, 48, 49, 65, 66, 68-70, and 72-75 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,381,864 issued to Nguyen *et al.* (hereinafter "*Nguyen*") in view of U.S. Patent No. 4,493,875 issued to Beck *et al.* (hereinafter "*Beck*"). With respect to this rejection, the Office Action states:

> Nguyen et al '864 discloses a method of treating a subterranean formation comprising continuously forming and

injecting a treating composition into a well (See column 12, lines 46-66). The treating composition comprises a mixture including both a carrier fluid and a particulate blend suspended in the carrier fluid, the particulate blend comprising a large particulate material and a small particulate material (See column 7, lines 29-34). The use of a particulate blend of a *large* particulate material and a *small* particulate material (See column 5, lines 54-56) formed by admixing one of the particulate materials with the other of the particulate materials (See column 6, lines 1-4) in a subterranean treating composition for treating subterranean formation provides permeability levels and production rates substantially superior to those provided by the single-sized small particulate systems used heretofore (See column 7, lines 6-15). Examples of particulate materials commonly used as fracturing proppants for gravel packing and frac-pack operations include: *sand*; *glass beads*; nut shells; metallic pellets or spheres; gravel; synthetic resin pellets or spheres; gilsonite; coke; sintered alumina; mullite; like materials; and **combinations thereof** (See column 2, lines 17-23). The composition includes a gelled aqueous carrier liquid (See column 9, lines 20-21) and a hardenable resin system which will consolidate the particulate blend to form a hard permeable mass (See column 7, lines 34-37). The resin system can be included as a **precoating** on the individual particles of the particulate blend (See column 7, lines 29-43). Generally, the hardenable resin system may include any *epoxy* resin system, *phenolic/aldehyde* resin system, or *other bonding resin* system used in the art for consolidating particulates to form permeable beds or flow paths (See column 10, lines 35-49). The hardenable resin system will preferably also include one or more surfactants which will improve the wettability of the particulate materials used in the treating composition and will thereby enable the hardenable resin system to **rapidly coat** the particulate materials (See column 12, lines 23-31).

As to claimed particle size of 4-100 U.S. mesh, Nguyen et al '864 further teaches that the large particulate material consists essentially of particles smaller than about **4 mesh**, but not smaller than about 40 mesh (See column 5, lines 58-60). The small particulate material consists essentially of particles smaller than about 16 mesh, but not smaller than about **100 mesh** (See column 5, lines 60-62).

As to claimed coating on-the-fly, Nguyen et al '864 further teaches that the components of the treating composition can be blended together using generally **any procedure which is commonly used** for preparing fracturing, frac-pack, and gravel packing compositions, e.g. by first mixing the gelling agent with brine or some other aqueous fluid to form the gelled aqueous

carrier liquid, transporting the gelled aqueous carrier liquid to a mixing apparatus such as a **continuous stream** tub mixer, and **continuously adding the other components** and mixing with the gelled aqueous carrier fluid, and continuously drawing the resulting mixture from the mixer and injected the mixture into the well to a desired subterranean zone (See column 12, lines 46-66).

Nguyen et al '864 fails to teach that a *large* dense particulate material is combined with small particulate material of reduced density in claimed order (Claim 35).

Beck et al teaches that a composite proppant having reduced density approaching densities of typical fracturing fluids tends to avoid the settling problem (See column 1, lines 58-62). This is achieved without any sacrifice in the compressive strength of the proppant material by coating large dense particles with small particulate material of reduced density (See column 1, lines 58-69) such as glass beads or fly ash (See column 2, lines 5-8). The composite particles may be formed by (1) mixing the core particles with adhesive to provide adhesive-coated core particles, (2) while the adhesive is tacky, mixing the coated core particles with hollow microparticles (preferably hollow ceramic microparticles) to adhere a plurality of the microparticles to each coated core (See column 2, lines 55-68), and (3) curing each adhesive composition to a nontacky state while keeping the individual coated core particles substantially out of adherent contact with each other (See column 3, lines 1-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a composite proppant having reduced density approaching densities of typical fracturing fluids instead of a particulate blend in Nguyen et al '864 with the expectation of avoiding the settling problem, as taught by Beck et al.

Note that Nguyen et al '864 teaches that hardenable epoxy resin ***rapidly* coats** particulate materials such as sand or *glass beads* in a treating composition in the presence of the gelled aqueous carrier liquid and a surface active agent (See column 12, lines 23-28). Obviously, *glass beads* added to the stream comprising resin coated particles **would adhere** to resin because Nguyen et al '864 teaches that the epoxy resin **rapidly coats** *glass beads* in the stream.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have *continuously* formed a composite proppant in Nguyen et al '864 in view of Beck et al by adding a first stream of epoxy resin and large dense particles to a **continuous stream** tub mixer thereby forming resin coated large particles followed by adding a second stream of

> small particles of reduced density with the expectation of providing the desired composite proppant comprising large dense particles coated with small particles of reduced density.
>
> As to claim 42, Nguyen et al '864 teaches that examples of epoxy resins preferred for use in the present invention include: diglycidyl ethers of bisphenol-A; diglycidyl ethers of bisphenol-F; glycidyl ethers of aminophenols; glycidyl ethers of methylenedianiline; and epoxy *novolac* resins. (See column 10, lines 56-60). The epoxy resins used in the present invention will preferably have epoxide equivalent weights (EEW) in the range of from about 90 to about 300 (claimed polyepoxide resin) (See column 10, lines 60-66).
>
> As to claim 48, Nguyen et al '864 teaches that the large particulate material consists essentially of particles smaller than about 4 mesh, but not smaller than about 40 mesh, and the small particulate material consists essentially of particles smaller than about 16 mesh, but not smaller than about 100 mesh (See column 5, lines 58-62). Although Nguyen et al '864 teaches that substantially all of the small particulate material are smaller than substantially all large particulate material (See column 5, lines 63-65), small particles could be a little bit smaller, i.e. similar in size.

(Office Action at 3-6.) Applicants respectfully disagree.

In order for a reference or combination of references to form the basis for a rejection under § 103(a), a *prima facie* case of obviousness must be established. Obviousness is determined by construing the scope of the prior art, identifying the differences between the claims and the prior art, determining the level of skill in the pertinent art at the time of the invention, and considering objective evidence present in the application indicating obviousness or nonobviousness. *Graham v. John Deere*, 383 U.S. 1, 17 (1966). Applicants respectfully submit that due to the differences between the claims as currently amended and the cited references the Examiner has not established a *prima facie* case of obviousness, in that the combination of *Nguyen* and *Beck* does not teach each and every recitation of the present claims.

In particular, the combination of *Nguyen* and *Beck* fails to teach or suggest "combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, the second flow stream, and a...fluid, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream," as required by independent claims 35 and 68, as amended. In contrast, *Nguyen* discloses that the use of a continuous tub mixer, wherein "[a]s the components are mixed, the resulting mixture is continuously drawn from the mixer." *See Nguyen*, col. 12, lines

46-66. There mere fact that a stream may be continuously drawn from a tub mixer does not imply that *Nguyen* discloses combining a first flowing stream and a second flowing stream to form a third flowing stream, wherein the first flowing stream and second flowing stream are combined and mixed ***while continuing to flow as a stream***. Therefore, *Nguyen* fails to disclose each and every element of independent claims 35 and 68, as amended. Moreover, the combination of *Nguyen* with *Beck* also fails to obviate the deficiencies of *Nguyen*. Rather, the Examiner relies on *Beck* for its alleged disclosure of "a composite proppant having reduced density approaching densities of typical fracturing fluids." (*See* Office Action at 5.) Therefore, Applicants respectfully submit that the combination of *Nguyen* and *Beck* fails to teach, suggest, or disclose each and every element of independent claims 35 and 68.

For at least these reasons, Applicants respectfully assert that independent claim 35 and 68 and their dependent claims are not rendered obvious by the combination of *Nguyen* and *Beck*. Accordingly, Applicants respectfully request withdrawal of this rejection with respect to claims 35, 36, 42, 45, 48, 49, 65, 66, 68-70, and 72-75.

**B. Claims 43 and 74**

Claims 43 and 74 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Nguyen* in view of *Beck* in further view of U.S. Patent No. 4,665,988 issued to Murphey *et al.* (hereinafter "*Murphey '988*"). With respect to this rejection, the Office Action states:

> The cited prior art fails to teach claimed solvent.
>
> Murphey et al '988 teach that the use of ethylene glycol butyl ether (See column 5, line 54) as a solvent for dissolving epoxy resins (See column 5, lines 47-48) such as bisphenol A-epichlorohydrin (See column 5, line 60).
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used ethylene glycol butyl ether as a solvent in the cited prior art since Murphey et al '988 teach that the use of ethylene glycol butyl ether as a solvent for dissolving epoxy resins such as bisphenol A-epichlorohydrin, and Nguyen et al '864 does not limit its teaching to particular solvents.

(Office Action at 6-7.) Applicants respectfully disagree.

As discussed above in Section III (A), the combination of *Nguyen* and *Beck* fails to teach, suggest, or disclose each and every element of independent claims 35 and 68, as amended. Nor does the combination of *Nguyen* and *Beck* with *Murphey '988* teach, suggest, or

disclose each and every element of independent claims 35 and 68. Rather, the Examiner relies on *Murphey '988* for its alleged disclosure of ethylene glycol butyl ether as a solvent for dissolving epoxy resins. (*See* Office Action at 7.) Therefore, Applicants respectfully submit that the combination of *Nguyen*, *Beck*, and *Murphey '988* fails to teach, suggest, or disclose each and every element of independent claims 35 and 68. Claims 43 and 74 depend, either directly or indirectly, from independent claims 35 or 68, and thus require each and every limitation of the independent claim from which they depend. Thus, Applicants respectfully submit that claims 43 and 74 are not rendered obvious by the combination of *Nguyen*, *Beck*, and *Murphey '988*. Therefore, Applicants respectfully request the withdrawal of this rejection with respect to claims 43 and 74.

**C. Claims 45, 46, 75, and 76**

Claims 45, 46, 75, and 76 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Nguyen* in view of *Beck* in further view of U.S. Patent Application Publication No. 2002/0048676 by McDaniel *et al.* (hereinafter "*McDaniel*"). With respect to this rejection, the Office Action states:

> Nguyen et al '864 in view of Beck et al fails to teach that the binder could be glycidyl either or epoxies such as bisphenol A-epichlorohydrin resin (Claim 42) or a polyester resin or a natural resin (Claims 45-46).
>
> McDaniel et al teaches that a liquid resole phenol/formaldehyde resin (See P53, 70, 98) or glycidyl either or epoxies such as bisphenol A-epichlorohydrin resin (See P187) or a polyester resin (See P70) or a natural resin (See P75) can be used for binding particles together. In other words, the resins are functionally equivalent.
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a resin composition comprising glycidyl either or epoxies such as bisphenol A-epichlorohydrin resin or a polyester resin or a natural resin in Nguyen et al '864 in view of Beck et al instead of a liquid resole phenol/formaldehyde resin with the expectation of providing the desired coated particles since McDaniel et al teaches that a liquid resole phenol/formaldehyde resin or glycidyl either or epoxies such as bisphenol A-epichlorohydrin resin or a polyester resin or a natural resin can be used for binding particles together.

(Office Action at 7-8.) Applicants respectfully disagree.

As discussed above in Section III (A), the combination of *Nguyen* and *Beck* fails to teach, suggest, or disclose each and every element of independent claims 35 and 68. Nor does the combination of *Nguyen* and *Beck* with *McDaniel* teach, suggest, or disclose each and every element of independent claims 35 and 68. Rather, the Examiner relies on *McDaniel* for its alleged disclosure that a liquid resole phenol/formaldehyde resin, glycidyl ether, an epoxy such as bisphenol A-epichlorohydrin resin, a polyester resin, or a natural resin can be used for binding particles together. (*See* Office Action at 7.) Therefore, Applicants respectfully submit that the combination of *Nguyen*, *Beck*, and *McDaniel* fails to teach, suggest, or disclose each and every element of independent claims 35 and 68. Claims 45, 46, 75, and 76 depend, either directly or indirectly, from independent claims 35 or 68, and thus require each and every limitation of the independent claim from which they depend. Thus, Applicants respectfully submit that claims 45, 46, 75, and 76 are not rendered obvious by the combination of *Nguyen*, *Beck*, and *McDaniel*. Therefore, Applicants respectfully request the withdrawal of this rejection with respect to claims 45, 46, 75, and 76.

**D. Claims 18, 19, 25, 28, 31, 32, 71, and 77**

Claims 18, 19, 25, 28, 31, 32, 71, and 77 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Nguyen* in view of *Beck* in further view of U.S. Patent No. 4,969,523 issued to Martin *et al.* (hereinafter "*Martin*"). With respect to this rejection, the Office Action states:

> The cited prior art fails to teach that polystyrene divinylbenzene may be used as the density reducing material.
>
> Martin et al teaches that a combination of first and second particles having a density within the range of about 0.7 to about 4.0 (See column 3, lines 12-26), wherein first particles has a density selected from the lower portion of the density range such as polystyrene divinylbenzene (SVDB) (See column 3, line 28) and the second particles has a density selected from the upper portion of the density range such as sand (See column 3, line 33) may be used in a servicing fluid for gravel packing of subterranean well (See column 2, lines 12-15). In other words, Martin et al teach that low density SVDB is suitable for the use in a servicing fluid, i.e. it is inert to components in the subterranean formation, e.g., well treatment fluids, and is able to withstand the conditions, e.g., temperature and pressure, in the well.
>
> Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used low

> density SVDB as the density reducing material in the cited prior art since Martin et al teach that low density SVDB is suitable for the use in a servicing fluid, and Nguyen et al '864 and Beck et al do not limit the density reducing material.

(Office Action at 8-9.) Applicants respectfully disagree.

As discussed above in Section III (A), the combination of *Nguyen* and *Beck* fails to teach, suggest, or disclose "combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, the second flow stream, and a [] fluid, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream," as required by independent claim 68, as amended. For at least the same reasons the combination of *Nguyen* and *Beck* also fails to teach, suggest, or disclose this limitation as required by independent claim 18, as amended. Nor does the combination of *Nguyen* and *Beck* with *Martin* teach, suggest or disclose the limitation. Rather, the Examiner relies on *Martin* for its alleged disclosure that polystyrene divinylbenzene may be used as the density reducing material. (*See* Office Action at 8.) Therefore, Applicants respectfully submit that the combination of *Nguyen*, *Beck*, and *Martin* fails to teach, suggest, or disclose each and every element of independent claims 18 and 68. Claims 19, 25, 28, 31, 32, 71, and 77 depend, either directly or indirectly, from independent claims 18 or 68, and thus require each and every limitation of the independent claim from which they depend. Thus, Applicants respectfully submit that claims 18, 19, 25, 28, 31, 32, 71, and 77 are not rendered obvious by the combination of *Nguyen*, *Beck*, and *Martin*. Therefore, Applicants respectfully request the withdrawal of this rejection with respect to claims 18, 19, 25, 28, 31, 32, 71, and 77.

**E. Claim 26**

Claim 26 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Nguyen* in view of *Beck*, *Martin*, and *Murphey '988*. With respect to this rejection, the Office Action states:

> The cited prior art fails to teach claimed solvent.
>
> Murphey et al '988 teach that the use of ethylene glycol butyl ether (See column 5, line 54) as a solvent for dissolving epoxy resins (See column 5, lines 47-48) such as bisphenol A-epichlorohydrin (See column 5, line 60).
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used ethylene glycol butyl ether as a solvent in the cited prior art since Murphey et al

> '988 teach that the use of ethylene glycol butyl ether as a solvent for dissolving epoxy resins such as bisphenol A-epichlorohydrin, and Nguyen et al '864 does not limit its teaching to particular solvents.

(Office Action at 9.) Applicants respectfully disagree.

As discussed above in Section III (B) and Section III (D), the combination of *Nguyen*, *Beck*, and *Murphey '988* and the combination of *Nguyen*, *Beck*, and *Martin* both fail to teach, suggest, or disclose "combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, the second flow stream, and a [] fluid, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream," as required by independent claim 18, as amended. For at least the same reasons, the combination of *Nguyen*, *Beck*, *Martin*, and *Murphey '988* also fails to teach, suggest, or disclose this limitation as required by independent claim 18. Claim 26 depends indirectly from independent claim 18 and thus requires each and every limitation of that independent claim. Thus, Applicants respectfully submit that claim 26 is not rendered obvious by the combination of *Nguyen*, *Beck*, and *Martin*, and *Murphey '988*. Therefore, Applicants respectfully request the withdrawal of this rejection with respect to claim 26.

**F. Claims 28 and 29**

Claims 28 and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Nguyen* in view of *Beck*, *Martin*, and *McDaniel*. With respect to this rejection, the Office Action states:

> The cited prior art fails to teach that the binder could be glycidyl either or epoxies such as bisphenol A-epichlorohydrin resin or a polyester resin or a natural resin.
>
> McDaniel et al teaches that a liquid resole phenol/formaldehyde resin (See P53, 70, 98) or glycidyl either or epoxies such as bisphenol A-epichlorohydrin resin (See P187) or a polyester resin (See P70) or a natural resin (See P75) can be used for binding particles together. In other words, the resins are functionally equivalent.
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a resin composition comprising glycidyl either or epoxies such as bisphenol A-epichlorohydrin resin or a polyester resin or a natural resin in Nguyen et al '864 in view of Beck et al instead of a liquid resole phenol/formaldehyde resin with the expectation of providing the desired coated particles since McDaniel et al teaches that a

> liquid resole phenol/formaldehyde resin or glycidyl either or epoxies such as bisphenol A-epichlorohydrin resin or a polyester resin or a natural resin can be used for binding particles together.

(Office Action at 9-10.) Applicants respectfully disagree.

As discussed above in Section III (C) and Section III (D), the combination of *Nguyen*, *Beck*, and *McDaniel* and the combination of *Nguyen*, *Beck*, and *Martin* both fail to teach, suggest, or disclose "combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, the second flow stream, and a [] fluid, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream," as required by independent claim 18, as amended. For at least the same reasons, the combination of *Nguyen*, *Beck*, *Martin*, and *McDaniel* also fails to teach, suggest, or disclose this limitation as required by independent claim 18. Claims 28 and 29 depend, either directly or indirectly, from independent claim 18 and thus required each and every limitation of that independent claim. Thus, Applicants respectfully submit that claims 28 and 29 are not rendered obvious by the combination of *Nguyen*, *Beck*, and *Martin*, and *McDaniel*. Therefore, Applicants respectfully request the withdrawal of this rejection with respect to claims 28 and 29.

**G. Claims 35, 36, 42, 45, 46, 48, 49, 68-70, 72, 73, 75, and 76**

Claims 35, 36, 42, 45, 46, 48, 40, 68-70, 72, 73, 75, and 76 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,128,390 issued to Murphey *et al.* (hereinafter "*Murphey '390*") in view of *McDaniel*. With respect to this rejection, the Office Action states:

> Murphey et al '390 discloses a method of treating a subterranean formation comprising **continuously forming and transporting** resin coated particulate materials in aqueous gels (See column 2, lines 16-23). The method basically comprises admixing a gelled aqueous carrier liquid, uncoated particulate material, a *polyepoxide* resin composition which will subsequently harden and a surface active agent whereby forming and suspending consolidatable resin coated particulate materials in gelled aqueous carrier liquid (See Abstract; column 2, lines 23-29). The particulate material is usually sand. However, other types of particulate material such as glass beads, sintered bauxite, etc. can be used if desired. Preferably, the particulate material is of a particle size in the range of from about **10 to about 70 mesh**, U.S. Sieve Series. When the particulate material is sand, a particular particle size within the broad range mentioned above is utilized depending upon

the particle size and distribution of formation sand adjacent to which the resin coated sand is to be deposited. See column 2, lines 3-19. The hardenable polyepoxide resin composition substantially **instantaneously coats** the particulate material in the presence of the gelled aqueous carrier liquid when a surface active agent is also present (See column 4, lines 20-26). The resin composition is generally comprised of a solvent system for the resin, a hardening agent, a coupling agent and a hardening rate controller (See column 4, lines 26-30). The resin coated particulate material can be utilized in the performance of gravel packing procedures or as a proppant material in fracturing treatments performed in a subterranean formation. The resin coated particulate material can also be utilized in the formation of controled permeability synthetic formations within a subterranean zone (See column 8, lines 30-36).

Murphey et al '390 fails to teach that a density reducing material is used in combination with sand (Claim 35).

McDaniel et al teaches that the use of a *composite* particle comprising a ***low density*** **filler** material (such as ground walnut shells) and a ***higher density*** **filler** material (such as finely divided silica) ***bound*** **by a suitable binder** (See P53) such that the composite particle has the desired low density in a subterranean treating composition is advantageous because it facilitates transporting the composite particles and facilitates injection into the subterranean formation (See P57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a *composite* particle comprising a ***low density*** **filler** material (such as ground walnut shells) and a ***higher density*** **filler** material (such as finely divided silica) ***bound*** **by a suitable binder** as particulate materials in Murphey et al '390 with the expectation of providing the desired facilitated transporting the composite particles and facilitated injection into the subterranean formation, as taught by McDaniel et al.

As to claimed on-the-fly coating, Murphey et al '390 teaches that the method is carried out by preparing an aqueous gelled carrier liquid by combining a gelling agent with the water, conducting a substantially *continuous stream* of the aqueous gelled carrier liquid to a continuous stream mixing tub or the equivalent apparatus, adding a substantially continuous stream of liquid surface active agent, a substantially continuous stream of *particulate* material to the mixing tub as is a substantially continuous stream of premixed liquid polyepoxide resin composition, and withdrawing a substantially *continuous stream of the resulting mixture* therefrom and **pumping** by way of a conduit

system down the well bore into a subterranean zone wherein the resin coated particulate material is deposited and consolidated into a hard permeable mass (See column 8, lines 10-29). Note that Murphey et al '390 teaches that hardenable epoxy resin **coats** particulate materials such as *sand* or *glass beads* in a treating composition substantially **instantaneously** in the presence of the gelled aqueous carrier liquid and a surface active agent (See column 4, lines 20-26). Obviously, *glass beads* added to the stream comprising resin coated particles **would adhere** to resin because Murphey et al '390 teaches that the epoxy resin substantially **instantaneously coats** *glass beads* in the stream.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have *continuously* formed a composite proppant in the cited prior art by adding a first stream of epoxy resin and dense particles to a **continuous stream** tub mixer thereby forming resin coated large particles followed by adding a second stream of small particles of reduced density with the expectation of providing the desired composite proppant comprising large dense particles coated with small particles of reduced density.

As to claim 42, Murphey et al '390 teaches that polyepoxide is bisphenol A-epichlorohydrin resin (See column 4, lines 34-36).

As to claims 45-46, 75-76, McDaniel et al teaches that a liquid resole phenol/formaldehyde resin (See P53, 70, 98) or glycidyl either or epoxies such as bisphenol A-epichlorohydrin resin (See P187) or a polyester resin (See P70) or a natural resin (See P75) can be used for binding particles together.

(Office Action at 10-13.) Applicants respectfully disagree.

In order for a reference or combination of references to form the basis for a rejection under § 103(a), a *prima facie* case of obviousness must be established. Obviousness is determined by construing the scope of the prior art, identifying the differences between the claims and the prior art, determining the level of skill in the pertinent art at the time of the invention, and considering objective evidence present in the application indicating obviousness or nonobviousness. *Graham v. John Deere*, 383 U.S. 1, 17 (1966). Applicants respectfully submit that due to the differences between the claims as currently amended and the cited references the Examiner has not established a *prima facie* case of obviousness, in that the combination of *Murphey '390* and *McDaniel* does not teach each and every recitation of the present claims.

In particular, the combination of *Murphey '390* and *McDaniel* fails to teach or suggest "combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, the second flow stream, and a [] fluid, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream," as required by independent claims 35 and 68, as amended. In contrast, *Murphey '390* discloses that a "substantially continuous stream . . . is conducted to a continuous stream mixing tub . . . wherein it is mixed with a substantially continuous stream." *See Nguyen*, col. 8, lines 10-18. There mere fact that two streams may be simultaneously introduced into a mixing tub does not imply that *Murphey '390* discloses combining a first flowing stream and a second flowing stream to form a third flowing stream, wherein the first flowing stream and second flowing stream are combined and mixed ***while continuing to flow as a stream***. Therefore, *Murphey '390* fails to disclose each and every element of independent claims 35 and 68, as amended. Moreover, the combination of *Murphey '390* with *McDaniel* also fails to obviate the deficiencies of *Murphey '390*. Rather, the Examiner relies on *McDaniel* for its alleged teaching of using a density reducing material in combination with sand. (*See* Office Action at 11.) Therefore, Applicants respectfully submit that the combination of *Murphey '390* and *McDaniel* fails to teach, suggest, or disclose each and every element of independent claims 35 and 68.

For at least these reasons, Applicants respectfully assert that independent claim 35 and 68 and their dependent claims are not rendered obvious by the combination of *Murphey '390* and *McDaniel*. Accordingly, Applicants respectfully request withdrawal of this rejection with respect to claims 35, 36, 42, 45, 46, 48, 49, 68-70, 72, 73, 75, and 76.

**H. Claims 43 and 74**

Claims 43 and 74 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Murphey '390* in view of *McDaniel* and *Murphey '988*. With respect to this rejection, the Office Action states:

> The cited prior art fails to teach claimed solvent.
>
> Murphey et al '988 teach that the use of ethylene glycol butyl ether (See column 5, line 54) as a solvent for dissolving epoxy resins (See column 5, lines 47-48) such as bisphenol A-epichlorohydrin (See column 5, line 60).
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used ethylene glycol

> butyl ether as a solvent in the cited prior art since Murphey et al '988 teach that the use of ethylene glycol butyl ether as a solvent for dissolving epoxy resins such as bisphenol A-epichlorohydrin, and Murphey et al '390 does not limit its teaching to particular solvents.

(Office Action at 13.) Applicants respectfully disagree.

As discussed above in Section III (G), the combination of *Murphey '390* and *McDaniel* fails to teach, suggest, or disclose each and every element of independent claims 35 and 68, as amended. Nor does the combination of *Murphey '390* and *McDaniel* with *Murphey '988* teach, suggest, or disclose each and every element of independent claims 35 and 68. Rather, the Examiner relies on *Murphey '988* for its alleged disclosure of ethylene glycol butyl ether as a solvent for dissolving epoxy resins. (*See* Office Action at 13.) Therefore, Applicants respectfully submit that the combination of *Murphey '390*, *McDaniel*, and *Murphey '988* fails to teach, suggest, or disclose each and every element of independent claims 35 and 68. Claims 43 and 74 depend, either directly or indirectly, from independent claims 35 or 68, and thus require each and every limitation of the independent claim from which they depend. Thus, Applicants respectfully submit that claims 43 and 74 are not rendered obvious by the combination of *Murphey '390*, *McDaniel*, and *Murphey '988*. Therefore, Applicants respectfully request the withdrawal of this rejection with respect to claims 43 and 74.

**I. Claims 18, 19, 25, 28, 29, 31, 32, 71, and 77**

Claims 18, 19, 25, 28, 29, 31, 32, 71, and 77 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Murphey '390* in view of *McDaniel* and *Martin*. With respect to this rejection, the Office Action states:

> The cited prior art fails to teach that polystyrene divinylbenzene may be used as the density reducing material.
>
> Martin et al teaches that a combination of first and second particles having a density within the range of about 0.7 to about 4.0 (See column 3, lines 12-26), wherein first particles has a density selected from the lower portion of the density range such as polystyrene divinylbenzene (SVDB) (See column 3, line 28) and the second particles has a density selected from the upper portion of the density range such as sand (See column 3, line 33) may be used in a servicing fluid for gravel packing of subterranean well (See column 2, lines 12-15). In other words, Martin et al teach that low density SVDB is suitable for the use in a servicing fluid, i.e. it is inert to components in the subterranean formation, e.g., well

> treatment fluids, and is able to withstand the conditions, e.g., temperature and pressure, in the well.
>
> Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used low density SVDB as the density reducing material in the cited prior art since Martin et al teach that low density SVDB is suitable for the use in a servicing fluid, and McDaniel et al does not limit its teaching to particular density reducing materials.

(Office Action at 14.) Applicants respectfully disagree.

As discussed above in Section III (G), the combination of *Murphey '390* and *McDaniel* fails to teach, suggest, or disclose "combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, the second flow stream, and a [] fluid, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream," as required by independent claim 68, as amended. For at least the same reasons the combination of *Murphey '390* and *McDaniel* also fails to teach, suggest, or disclose this limitation as required by independent claim 18, as amended. Nor does the combination of *Murphey '390* and *McDaniel* with *Martin* teach, suggest or disclose the limitation. Rather, the Examiner relies on *Martin* for its alleged disclosure that polystyrene divinylbenzene may be used as the density reducing material. (*See* Office Action at 14.) Therefore, Applicants respectfully submit that the combination of *Murphey '390*, *McDaniel*, and *Martin* fails to teach, suggest, or disclose each and every element of independent claims 18 and 68. Claims 19, 25, 28, 29, 31, 32, 71, and 77 depend, either directly or indirectly, from independent claims 18 or 68, and thus require each and every limitation of the independent claim from which they depend. Thus, Applicants respectfully submit that claims 18, 19, 25, 28, 29, 31, 32, 71, and 77 are not rendered obvious by the combination of *Murphey '390*, *McDaniel*, and *Martin*. Therefore, Applicants respectfully request the withdrawal of this rejection with respect to claims 18, 19, 25, 28, 29, 31, 32, 71, and 77.

**J. Claim 26**

Claim 26 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Murphey '390* in view of *McDaniel*, *Martin*, and *Murphey '988*. With respect to this rejection, the Office Action states:

> The cited prior art fails to teach claimed solvent.
>
> Murphey et al '988 teach that the use of ethylene glycol butyl ether (See column 5, line 54) as a solvent for dissolving

> epoxy resins (See column 5, lines 47-48) such as bisphenol A-epichlorohydrin (See column 5, line 60).
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used ethylene glycol butyl ether as a solvent in the cited prior art since Murphey et al '988 teach that the use of ethylene glycol butyl ether as a solvent for dissolving epoxy resins such as bisphenol A-epichlorohydrin, and Nguyen et al '864 does not limit its teaching to particular solvents.

(Office Action at 14-15.) Applicants respectfully disagree.

As discussed above in Section III (H) and Section III (I), the combination of *Murphey '390*, *McDaniel*, and *Murphey '988* and the combination of *Murphey '390*, *McDaniel*, and *Martin* both fail to teach, suggest, or disclose "combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, the second flow stream, and a [] fluid, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream," as required by independent claim 18, as amended. For at least the same reasons, the combination of *Murphey '390*, *McDaniel*, *Martin*, and *Murphey '988* also fails to teach, suggest, or disclose this limitation as required by independent claim 18. Claim 26 depends indirectly from independent claim 18 and thus requires each and every limitation of that independent claim. Thus, Applicants respectfully submit that claim 26 is not rendered obvious by the combination of *Murphey '390*, *McDaniel*, *Martin*, and *Murphey '988*. Therefore, Applicants respectfully request the withdrawal of this rejection with respect to claim 26.

**IV. No Waiver**

All of Applicants' arguments and amendments are without prejudice or disclaimer. Additionally, Applicants have merely discussed example distinctions from the cited references. Other distinctions may exist, and Applicants reserve the right to discuss these additional distinctions in a later Response or on Appeal, if appropriate. By not responding to additional statements made by the Examiner, Applicants do not acquiesce to the Examiner's additional statements, such as, for example, any statements relating to what would be obvious to a person of ordinary skill in the art.

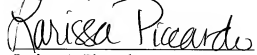
**SUMMARY AND PETITION**
**FOR ONE MONTH EXTENSION OF TIME**

In light of the above amendments and remarks, Applicants respectfully request reconsideration and withdrawal of the outstanding rejections. Applicants further submit that the application is now in condition for allowance, and earnestly solicit timely notice of the same. Should the Examiner have any questions, comments or suggestions in furtherance of the prosecution of this application, the Examiner is invited to contact the attorney of record by telephone, facsimile, or electronic mail.

Applicants hereby petition for a one-month extension of time to file this response under 37 C.F.R. § 1.136(a), extending the deadline from April 14, 2009 to May 14, 2009. Accordingly, Applicants have authorized via the Office's electronic filing system the Commissioner to debit the Deposit Account of Baker Botts L.L.P., Deposit Account No. 02-0383, Order Number 063718.0178, in the amount of $130.00 under 37 C.F.R. § 1.17(a)(1) for the one-month extension of time, extending the period to reply up to and including May 14, 2009.

Should the Commissioner deem that any additional fees are due, the Commissioner is authorized to debit Baker Botts L.L.P.'s Deposit Account No. 02-0383, Order Number 063718.0178, for any underpayment of fees that may be due in association with this filing.

Respectfully submitted,



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